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Diagnosis of Posttraumatic Stress Disorder (PTSD) by the Structured Clinical Interview SCID-I

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Summary

Objectives. Valid and reliable diagnosis of posttraumatic stress disorder is important for clinical practice, scientific research and forensic settings. The aim of the study was to assess the psychometric properties of the Polish version of SCID-I F Module for the diagnosis of PTSD.

Methods. Five hundred twenty six motor vehicle accident survivors participated in the study. Clinical diagnosis was based on SCID-I-PTSD interview. Participants filled out a set of self-report inventories concerning PTSD symptoms (PDS), depression (BDI-II), anxiety (STAI) and posttraumatic cognitions (PTCI).

Results. The interview assessment showed high reliability and both convergent and discriminative validity. SCID-I-PTSD interview proved to be more specific than PDS inventory. Interview items show good psychometric properties (except an item C3) and no differential item functioning for sex. Latent structure analysis of PTSD symptoms were nonconclusive.

Conclusions. A part of Module F of the SCID-I, a structured clinical interview for the assessment of posttraumatic stress disorder is a valid and reliable psychometric tool useful for the diagnosis of PTSD.

Key words: diagnosis, PTSD, SCID-I

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Introduction

The lifetime prevalence of PTSD is as high as 7% among adult population that experienced traumatic events [1]. PTSD symptoms tend to spontaneously remit during first two years after the trauma among about a half of the trauma victims. Chance for remission without a treatment decreases with time and symptoms influence negatively subjects' quality of life, and generate social costs resulting from the inability to work, long-term treatment, compensations [2]. Therefore a role of a valid clinical diagnosis enabling an implementation of effective treatment and a reliable assessment for litigation purposes cannot be underestimated.

The Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I) [3] is a well-established tool for the diagnosis of mental disorders [1, 4]. Full clinical version of the interview contains the handbook, overview and 10 thematic modules for the assessment of mood, (A, D) psychotic (B, C), substance use (E), anxiety (F), somatoform (G), eating (H), and adjustment (I) disorders, and additional disorders grouped in the optional J module. The whole version of the interview is rarely used in clinical practice – it is rather the user who composes the desired version depending on research/clinical needs [5–8]. The interview consists of standardized questions which do not omit any diagnostic criteria of the examined disorder. However, the classification of the patient's response as meeting the criteria, substandard or doubtful depends on interviewer's experience.

One part of the F module (anxiety disorders) was developed to diagnose the PTSD [3]. It consists of questions related to the lifetime trauma exposure (with the focus on the event still affecting the subject's life), peritraumatic emotions (DSM-IV-TR A criterion), trauma re-experiencing in the form of intrusive recollections, dreams, dissociative flashbacks or reactivity to the stimuli reminiscent of the trauma (DSM-IV-TR and ICD-10 B criterion), avoidance (conversations, memories, places reminding of the trauma), dissociative amnesia, narrowing of interests, relations, emotional numbing (DSM-IV-TR and ICD-10 C criterion) and hyperarousal (DSM-IV-TR and ICD-10 D criterion) [1, 3, 9]. Additionally, current severity of the disorder (mild, moderate, severe) or the level of symptoms' remission is assessed in a case of fulfilling only part of the PTSD criteria. The diagnosis with SCID-I-PTSD takes about 20-30 minutes.

The SCID-I-PTSD interview is often used to verify validity of other diagnostics methods, questionnaires or standardized interviews [10–13]. Despite changes introduced in DSM-5 [1], compared to DSM-IV-TR, the Polish version of SCID-I remains up-to-date due to similarities in criteria between DSM-IV-TR and ICD-10 (publication of the ICD-11 is planned in 2017).

The purpose of this paper is to present the psychometric properties of the Polish version of SCID-I F module to diagnose PTSD (SCID-I-PTSD) – its internal factorial structure, reliability and validity, as well as parameters of particular items and scales, and the congruence of PTSD diagnosis between SCID-I-PTSD interview and self-reported questionnaire.

Material

Studied group consisted of motor vehicle accidents survivors, who volunteered in a therapy offered by the programs TRAKT-I and TRAKT-II, after 1–48months after the traffic accident ($M = 17.7$; $SD = 11.5$). In general 614 diagnoses were conducted, but for purposes of this analysis the group was restricted to only 526 subjects for whom the complete set of validity data was obtained. Sample consisted of 377 females (71.7%) and 149 males aged 18-82 ($M = 37.1$; $SD = 12.7$), mainly with higher and secondary education $n = 459$ (87.3%).

Method

The study, approved by the Psychology Research Ethics Committee, was conducted in Interdisciplinary Centre for Behaviour Genetic Research at the University of Warsaw in the years 2008–2012. In addition to the diagnosis of PTSD established by SCID-I-PTSD [3], the following questionnaires were used for validation: PDS inventory (PTSD) [11, 14, 15], BDI-II (depression) [16], STAI (state anxiety) [17], and PTCI (negative posttraumatic cognitions) [18].

Diagnosis of PTSD was conducted by psychiatrists additionally trained in the SCID. The congruence of diagnoses assessed by two independent diagnosticians for randomly selected 30% of recorded interviews was 85% ($\kappa = 0.70, p < 0.05$); the result indicated acceptable level of congruence [19].

Results

Exploratory and confirmatory factor analysis

The data analysis was started with the assessment of the structure of items of SCID-I interview. Taking into account binary coding of answers: 1 = symptom, 0 = lack of symptom (applied also in this paper for PDS inventory), aside from exploratory analysis, the confirmatory factor analysis – DWLS method for the correlation matrix and the asymptotic covariance of SCID-I items. Exploratory factor analysis indicated isolating one factor (scree test) with eigenvalue equal to 6.63 (39% of explained variance) – similar results were obtained for items of PDS inventory (7.98; 47%). Confirmatory factor analysis did not lead to conclusive results – all examined models showed acceptable fit (RMSEA ≤ 0.08; *chi2/df* ≤ 3.0; CFI ≥ 0.95; GFI, AGFI ≥ 0.90 [20]). Incremental validity for three factors model was not higher than model with one factor. The best indices of fit were obtained for models consisting of 4 or 5 factors similarly to results for PDS inventory (for models suggested by Elhai et al. [21] and Simms et al. [22]). Tested models are depicted in footnotes to Table 1.

Table 1. **Results of confirmatory factor analysis of SCID-I interview items.**

Model	df	Satorra--Bentler chi^2	p	RMSEA	GFI	AGFI	CFI	Chi^2/df
One factor	119	352.97	0.01	0.061	0.990	0.987	0.989	2.97
Three factors (DSM-IV)	116	350.28	0.01	0.062	0.990	0.987	0.989	3.02
Four factors (King et al., 1998)	113	274.72	0.01	0.052	0.992	0.989	0.992	2.43
Four factors (Simms et al., 2002)	113	263.25	0.01	0.050	0.993	0.990	0.993	2.33
Five factors (Elhai et al., 2011)	109	253.81	0.01	0.050	0.993	0.990	0.993	2.33

Note: *df* – degrees of freedom; Satorra-Bentler *Chi2* – so-called resistant (to deviation from normal distribution) model fit statistics; *p* – level of statistical significance *Chi2*; RMSEA – root mean square error of approximation; GFI – goodness of fit index; AGFI – adjusted goodness of fit index; CFI – comparative fit index; *Chi2/df* – fit index taking into account the complexity of the model. DSM-IV Model: symptoms of reexperiencing (B1-B5), avoidance/numbing (C1-C7) and hyperarousal (D1-D5); King et al. model [26]: symptoms of C category divided into symptoms of avoidance (C1-C2) and numbing (C3-C7), symptoms of B and D category as in DSM-IV; Simms et al. model [22]: symptoms of avoidance (C1-C2), dysphoria (C3-D3) and hyperarousal (D4-D5), symptoms of B category as in DSM-IV; Elhai at al. model [21]: symptoms of C category divided into symptoms of avoidance (C1-C2) and numbing (C3-C7), symptoms of D category divided into symptoms of dysphoric arousal (D1-D3) and anxious arousal (D4-D5), symptoms of B category as in DSM-IV.

Very good indices of fit were obtained for the model assuming saturation of all interview items by general factor and three specific factors (*df* = 96; *chi2* = 131.10; RMSEA = 0.026; GFI, AGFI and CFI > 0.99; *chi2/df* = 1.37). This model led to over-estimated factor loadings, so it was not subsequently analyzed. The results do not falsify assumption considering one dimensional structure of PTSD construct, however, indicate that its internal structure is much more complicated than three factorial one as stipulated by the DSM-IV.

Properties of the SCID-I interview items

Table2 presents data referring to the statistical and psychometric properties of the SCID-I-PTSD interview items. In the basic analysis data showed high discriminative power indices of the items (higher for the general scale than categories, see previous conclusions), except the item C3 ("Inability to recall an important aspect of the trauma"). Very similar results were found for the PDS inventory – the lowest discriminative power for the assessment of this symptom: 0.39, while for others it was ranging from 0.57 to 0.73. This item, however, did not show lack of validity in reference to appropriate items of PDS inventory – in general congruence of PTSD diagnoses of SCID-I items ranged from 53% to 76% (C3 = 60%).

Table 2. **Descriptive characteristics and indices of validity of items of interview SCID-I.**

SCID: PTSD Items	M (SD)	MD	b (SD)	a (SD)	Information value	Congruent diagnoses	Cohen's kappa
B1	0.52 (0.50)	0.65 (0.58)	-0.03 (0.08)	2.30 (0.24)	2.30	0.72	0.42*
B2	0.27 (0.44)	0.49 (0.50)	0.82 (0.10)	1.98 (0.25)	1.98	0.70	0.42*
B3	0.22 (0.42)	0.47 (0.47)	0.94 (0.10)	2.38 (0.33)	2.38	0.53	0.20*
B4	0.62 (0.49)	0.74 (0.64)	-0.29 (0.08)	3.63 (0.42)	3.63	0.74	0.40*
B5	0.56 (0.50)	0.69 (0.65)	-0.13 (0.08)	2.73 (0.29)	2.73	0.76	0.50*
C1	0.50 (0.50)	0.60 (0.52)	0.04 (0.09)	1.99 (0.21)	1.99	0.75	0.50*
C2	0.53 (0.50)	0.62 (0.52)	-0.05 (0.09)	2.14 (0.22)	2.14	0.76	0.51*
C3	0.41 (0.49)	0.17 (0.17)	0.98 (0.35)	0.38 (0.10)	0.36	0.60	0.23*
C4	0.50 (0.50)	0.62 (0.58)	0.04 (0.09)	2.10 (0.22)	2.10	0.69	0.38*
C5	0.42 (0.49)	0.61 (0.57)	0.28 (0.09)	2.22 (0.24)	2.22	0.65	0.34*
C6	0.30 (0.46)	0.52 (0.48)	0.68 (0.10)	2.16 (0.27)	2.16	0.63	0.31*
C7	0.41 (0.49)	0.54 (0.50)	0.34 (0.09)	1.66 (0.18)	1.66	0.63	0.32*
D1	0.49 (0.50)	0.49 (0.41)	0.05 (0.10)	1.33 (0.15)	1.32	0.69	0.38*
D2	0.55 (0.50)	0.55 (0.49)	-0.16 (0.09)	1.62 (0.17)	1.62	0.68	0.33*
D3	0.58 (0.49)	0.53 (0.47)	-0.30 (0.10)	1.42 (0.16)	1.42	0.72	0.38*
D4	0.55 (0.50)	0.54 (0.44)	-0.15 (0.09)	1.66 (0.17)	1.66	0.68	0.33*
D5	0.57 (0.50)	0.53 (0.44)	-0.24 (0.10)	1.52 (0.16)	1.52	0.71	0.39*

Note. *M* – mean; *SD* – standard deviation; *MD* – discriminative power within the scale (and symptoms category); percentage of congruent diagnoses and Cohen's kappa were calculated in reference to relevant PDS items; significant correlations at $p < 0.05$ are marked with an asterisk; *a* – parameter of discrimination, b – parameter of difficulty; information value (for the range of the trait from -10z to +10z) calculated for two-parameters logistic model.

SCID-I-PTSD interview items' parameters for general scale were determined using two-parameters IRT model [23, 24], comprising their difficulty and discriminative power. Satisfactory results of confirmatory factor analysis and discriminative power indices of items justify the assumption of unidimensionality of the studied construct. Results of the Likelihood Ratio Test (LRT) for comparison of one-parameter and two-parameters models was statistically significant $LRT(16) = 233.1$; $p < 0.001$; while non-significant for comparison of two- and three-parameters models (with parameter of guessing) $LRT(17) = 0.41$; for that reason the further analyses were conducted only for two-parameters model. The results which are presented in Table 2 confirm the lowest discriminative power of the item C3 and good psychometric properties of all other items of the SCID-I-PTSD interview.

The differential item functioning analysis with regard to gender was conducted using the iterative hybrid ordinal logistic regression and Monte Carlo simulation im-

plemented in the lordifin package of statistical software R [25]. The findings did not indicate differential item functioning for females and males.

Congruency of diagnoses

Validity analyses was started with the estimation of congruency of PTSD diagnosis between SCID-I-PTSD interview and PDS inventory. The obtained results are presented in Table 3.

Table 3. **Number and percentage of congruent diagnoses of PTSD for SCID-I interview and PDS inventory.**

PDS/SCID	SCID-I: no PTSD	SCID-I: diagnosis of PTSD	Total (percentage)
PDS: no PTSD	113 (0.21)	18 (0.04)	131 (0.25)
PDS: diagnosis PTSD	94 (0.18)	301 (0.57)	395 (0.75)
Total (percentage)	207 (0.39)	319 (0.61)	526

Note. *chi2* = 160.82; *df* = 1; $p < 0.01$. Percentage of congruent diagnoses = 0.79; specificity = 0.86; sensitivity = 0.76, negative predictive value = 0.55, positive predictive value = 0.95 (calculated for PDS as reference measure).

The high congruence of PTSD diagnoses was equal to 79%, which indicates high validity of SCID-I interview for PTSD diagnosis. The highest discrepancy was recorded for subjects, who were diagnosed as not suffering from PTSD on the basis of SCID-I interview, but PTSD was diagnosed on the basis of PDS inventory. It is the result of higher frequency of PTSD diagnoses obtained with the inventory (75%) than the interview (61%). Similar findings were previously reported and suggest that the interview is more conservative method of diagnosing PTSD and probably it is more diagnostically specific than the inventory (to lesser extent affected by the whole spectrum of psychopathological symptoms).

Properties of scales of the SCID-I-PTSD interview

Table 4 presents statistical and psychometric properties of the interview scales: general and for all categories of symptoms of PTSD. The data for categories were presented due to their importance for PTSD diagnosis [4].

Table 4. **Descriptive statistics and validity indices of scales of SCID-I.**

SCID: PTSD symptoms	M	SD	Cronbach's alpha	Percentage of PTSD diagnoses	Percentage of congruent diagnoses	Cohen's kappa
B	2.19	1.73	0.79	0.72	0.83	0.49*
C	3.06	2.20	0.76	0.62	0.78	0.49*
D	2.72	1.67	0.69	0.75	0.84	0.50*
Total	7.98	5.09	0.90 (0.87)	0.61	0.79	0.52*

table continued on the next page

SCID: PTSD symptoms	PDS: PTSD	BDI-II: depression	STAI: state anxiety	PTCI: cognitions about the self	PTCI: cognitions about the world	PTCI: self-blame
B	B:0.65* (C:0.57* D:0.53*)	0.55*	0.53*	0.54*	0.40*	0.17*
C	C:0.65* (B:0.59* D:0.53*)	0.64*	0.55*	0.62*	0.46*	0.24*
D	D:0.62* (B:0.61* C:0.60*)	0.57*	0.52*	0.55*	0.51*	0.12*
Total	0.72*	0.65*	0.59*	0.63*	0.50*	0.20*

Note. *M* – mean; *SD* – standard deviation; Cronbach's alpha – reliability coefficient for 17 items (and three categories); percentage of congruent diagnoses and Cohen's *kappa* were calculated in reference to PDS inventory. PDS, BDI-II, STAI and PTCI – indices of correlation with the results of inventories: PDS, BDI-II, STAI – state anxiety, and PTCI: negative cognitions about the self, about the word and self-blame. Percentage of diagnoses of PTSD obtained via PDS: B = 0.87, C = 0.79 and D = 0.87, total scale = 0.75; number of symptoms in PDS: B = 3.48 (1.78), C = 4.71 (2.33) and 3.80 (1.58), total scale = 11.99 (5.18). Significant correlations ($p < 0.05$) are marked with an asterisk. Correlations of symptoms diagnosed via SCID-I with gender: -0.18* (Cohen's d = 0.39), percentage of diagnoses: females = 0.874, males = 0.724. Reliabilities for other scales – PTCI: 0.94 (21 items), 0.85 (7) and 0.84 (5), BDI-II: (21) 0.94, STAI (20) 0.91, PDS 0.93 (0.82) and for categories: 0.85, 0.84 and 0.80.

Findings indicate high reliability of SCID-I-PTSD scales (internal consistency) and validity of PTSD diagnoses in reference to the PDS inventory. Correlations with the PDS inventory were found higher than with other inventories, assessing anxiety, depression and posttraumatic cognitions, what indicate substantial convergent and discriminative validity of SCID-I. Correlations with these variables were at a time lower than appropriate correlations found for the PDS inventory. For comparison: 0.72* with BDI-II (the difference in reference to the same correlation obtained for SCID-I: $t = 3.17$, $p < 0.01$), 0.66* with STAI ($t = 2.90$, $p < 0.01$) and 0.65; 0.50* and 0.26* with PTCI scales (significant difference only for self-blame scale: $t = 1.90$, $p < 0.03$; all correlation coefficients obtained for the PDS inventory significant at $p < 0.01$). The analysis of relationships of PTSD symptoms, assessed by both diagnostic methods with other psychopathological symptoms were conducted using linear regression. The results are presented in Table 5 (the analysis was limited to symptoms of anxiety and depression, and cross-introduced scores of a given method of PTSD symptoms diagnosis).

Table 5. **Results of regression analysis: semipartial correlations for PTSD symptoms, assessed by SCID-I and PDS**

Independent variables / dependent variable	SCID-I: PTSD	PDS: PTSD
PDS or SCID-I	0.34*	0.30*
BDI-II	0.13*	0.19*
STAI	0.06*	0.13*

Note. SCID: $R = 0.75$; $R2 = 0.56$; $F = 222.14$; PDS: $R = 0.80$; $R2 = 0.65$. $F = 315.50$; df = 3/522; $p < 0.01$. Significant correlations ($p < 0.05$) are marked with an asterisk.

The results indicate the highest relation of both diagnostic methods (the highest semipartial correlations), but at the same time stronger relation of symptoms of PTSD diagnosed via the inventory than via the interview with symptoms of anxiety and de-

pression. The results suggest that the relation of self-report of PTSD symptoms with other psychopathological symptoms is stronger than clinician's assessment of PTSD symptoms, what leads to the conclusion that the inventory is more general and less diagnostically specific measure of PTSD symptoms than the interview.

Discussion

The results of the research indicate that SCID-I-PTSD provides a high quality diagnosis. Although the results of the analyzes do not allow for an unambiguous determination of the structure of disorder symptoms (RMSEA: 0.05–0.06; GFI, CFI, AGFI: 0.98–0.99 for all tested models), they suggest the existence of a single higher-order factor and a complex internal structure of symptoms different from the division of symptoms into B, C and criteria postulated in DSM-IV-TR or ICD-10. This finding is consistent with the results obtained by other researchers [21, 22, 26-28].

Interview items show good psychometric properties. Only the item C3, assessing inability to recall some aspects of traumatic event, was found poor for both the interview and the PDS inventory. Similar results were obtained in prior studies conducted on different populations and with different diagnostic methods [11, 12, 29]. Poor properties of the item C3 may be the result of the difficulty in differentiating whether memory loss is the result of loss of consciousness, and the specificity of the group assumes the risk of somatic, rather than dissociative causes of amnesia at least in some subjects (25% of the group reported traumatic head injury with loss of consciousness during the accident).

Lack of differential item functioning for sex proves that differences of PTSD symptoms (consistently higher for women [30]) are probably conditioned by social or biological factors (e.g. emotional reactivity [31]).

SCID-I-PTSD provides a reliable assessment. Indicators such as Cronbach's alpha (0.90 for the whole scale and 0.69-0.79 for particular criteria), high congruence between interview and questionnaire diagnoses and between diagnosticians are comparable to those obtained by Foa et.al. [11, 12]. Moderate correlations between inventory (as well as its scales) and measures of depression, anxiety and posttraumatic cognitions about self and world (0.40–0.65) as well as lower correlations with self-blame cognitions (0.20) prove convergent and discriminative validity of the tool.

Overestimation of PTSD symptoms by PDS inventory in comparison to SCID-I-PTSD interview is a meaningful result [12]. Self-reported measures, which are usually more sensitive and less specific than structured interviews, are very useful as screening tools, as they allow to shorten the time of the diagnosis and minimize the risk of losing patients with clinically significant level of PTSD symptoms. In the second step, a professional diagnosis needs to be made on the basis of a standardized interview, as it is characterized by a higher specificity and possibility of differentiating between particular symptoms by the experienced diagnostician. A homogeneous group of participants may be regarded as both advantage and disadvantage of this study – it is recommended to replicate it with participants who experienced different types of traumatic events.

Conclusions

The Polish version of SCID-I-PTSD interview is a reliable and valid diagnostic tool, which is more specific than self-reported inventories and allows to minimize the risk of making false positive diagnoses. Using the interview after the screening self-reported tool leads to higher efficiency of the diagnostic process without the decrease of its validity.

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